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ON CERTAIN EXCREMENTITIOUS DEPOSITS FOUND IN THE WEST.

BY H. W. HENSHAW.

In the volume on Zoology, forming one of Lt. Wheeler's reports to the chief of engineers, several pages are devoted to a discussion of the origin of certain resinous-like substances, found in the crevices and on the walls of many of the rocky cañons of the far west, and the conclusion arrived at that these were the excrementitious products of a species of lizard, *Euphryne obesa*. This opinion chiefly resulted from the fact, ascertained by chemical analysis, that these products were composed wholly of vegetable matter; in view of which fact the original supposition that they had been made by bats was abandoned, the diet of these animals being, as is well known, insectivorous. Hence their origin was attributed to the herbivorous lizard above mentioned, the inaccessibility of many of the spots where the substance was noticed being deemed sufficient proof to negative the possibility of its originating from any other mammal. In a note following, however, it is stated that Prof. Cope believes this excrement to have been produced by some small mammals, as the *Neotoma*.

As a matter of interest to some, and inasmuch as I learn that the subject has again been brought to notice by the receipt of similar specimens by the Academy of Natural Sciences of Philadelphia, which were made the subject of remarks at one of the Society's meetings, I propose offering a few suggestions regarding these deposits, especially since I believe I can speak with some degree of positiveness as to their origin.

During the past season, while in the neighborhood of Lake Tahoe, Cal., I had an opportunity of examining deposits of an exactly similar character, and under circumstances which admit of no doubt in my own mind that their originators are the big-eared rats (*Neotoma*), as believed by Prof. Cope.

My attention was directed to these deposits by Mr. H. G. Parker, of Carson City, Nevada, who stated, that, when visiting Cave Rock, on the borders of Tahoe, some ten years before, he had found the depressions and crevices of the rock to be inhabited by large numbers of a rat, which he described as having large ears

and a bushy tail. These characteristics point with certainty to a *Neotoma*, probably *N. cinerea*.

Incidentally he mentioned the "bituminous-like" deposits, the origin of which he was at a complete loss to understand, but which he finally satisfied himself were the product of these rats. Visiting the place myself, I found the deposits as described, but was unable to obtain any proof of the presence of the rats. It is possible they were still there, but, it being daytime, had hidden away in the remote crevices; or, as is quite probable, that their former haunt is now deserted. In either case the fact of their former occupation of the place in numbers, as attested by Mr. Parker, is sufficient.

The deposits here vary much in character, and, as any attempt to describe them in detail would occupy too much space, I will mention them briefly.

Specimens gathered from different parts of the rock showed all the differences between the hard, rounded, pill-like excrements, which no one could mistake the nature of, and the hardened bituminous substances, in mass, which bears no resemblance at all to excrement. The former is found on the flat shelves of rock, where, however, it is often partially dissolved by action of the urine, and perhaps too by water. In this form it is not readily recognizable, but a careful examination will show the rounded excrements through the whole mass, especially if it be broken.

In one case I found a crevice which had been filled up to the depth of at least two feet, with the stalks of weeds, small twigs, and even with a considerable amount of bird's feathers interspersed. This mass was evidently the accumulation of years, and had served as a nest. Throughout was a large amount of dry hard droppings, from which the urine had passed, and which was unmistakable. The urine charged with a certain amount of excrementitious matters had filtered through, to form below the singular deposits.

The "conglomerate masses" then are simply the excrement dissolved by urine, and carried from the original place of deposit in crevices or on shelves by water, or possibly by urine itself, if in sufficient quantity, and deposited on the faces of the walls, where it is perfectly true no animal without wings could reach; and in many cases, it might be added with equal truth, could not deposit the masses if they could reach the spot, inasmuch as they are

sometimes found on the *roof* of a hollow rock where they trickle from above.

This will account for the presence of the substance many feet away from the place where first deposited.

Finally, all the regions in which these masses of excrement are found are known to be inhabited by the *Neotoma*. The chemical analysis of these deposits made by Dr. Loew is also entirely in accordance with such an origin, as the *Neotoma* is eminently a vegetarian. Some of the deposits are unquestionably of great age, and the particular localities may or may not be inhabited at the present time by the rats. In many cases they certainly are not, as the erosion and breaking away of masses of the cliffs has in many instances rendered inaccessible points which formerly permitted free access.